

Appl. No. 10/684,252
Amdt. Dated 08/18/2006
Reply to Office action of 07/18/2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (currently amended) Treatment planning apparatus for an orthodontic patient, comprising:

a workstation having a processing unit and a display;

a memory storing a virtual three-dimensional model of teeth ~~and/or associated anatomical structures representing the dentition of a~~ having brackets placed on the surface of the teeth of the patient, wherein said virtual three-dimensional model of teeth having brackets placed on the surface of the teeth is obtained by scanning the patient's dentition; and

software executable by said processing unit to access said model and display said model on said display;

said software further including navigation tools enabling a user to interactively manipulate said model on said display, ~~[[and]]~~ simulate the movement of at least one tooth in said model relative to other teeth in said model, and position the teeth in the virtual model relative to each other so as to place the teeth of the virtual model into a target situation; and wherein said software automatically derives the three-dimensional configuration of a customized orthodontic archwire to move the teeth to the target situation, based on the location of brackets on the surface of the teeth and the target situation for the teeth of the patient.

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Claim 2. (new) The apparatus of claim 1, wherein said virtual model comprises a set of virtual, individual three-dimensional tooth objects and wherein said software enables a user of said workstation to select an archform for said virtual model, wherein said set of tooth objects are moved with respect to said archform.

Claim 3. (new) The apparatus of claim 1, wherein said virtual model comprises a set of virtual, individual three-dimensional tooth objects and wherein said set of tooth objects are moved with respect to each other to define an archform representing, at least in part, a proposed treatment for the patient.

Claim 4. (new) The apparatus of claim 2 or claim 3, wherein said software displays a screen permitting a user to customize the shape of said archform.

Claim 5. (new) The apparatus of claim 1, wherein said scanning of the dentition of the patient including brackets is performed using a scanning system, said scanning system comprising software for processing captured images from said scanning system and converting said captured images into said virtual model of the dentition including brackets.

Claim 6. (new) The apparatus of claim 5, wherein said scanning system further comprises a hand-held scanner adapted for intra-oral, in-vivo scanning of a human patient.

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Claim 7. (new) The method of claim 1, further comprising the step of determining whether a collision of teeth and/or brackets occurs during the movement of the virtual model of the teeth from the current situation to the target situation.

Claim 8. (new) The method of claim 1, further comprising the step of exporting the parameters for the customized orthodontic archwire to an appliance manufacturing facility and manufacturing the customized orthodontic archwire from the exported parameters.

Claim 9. (new) The apparatus of claim 1, wherein the virtual model of the dentition includes upper and lower archforms representing the teeth of the upper and lower arches of the patient, and wherein the software enables a user to simulate changes in the placement of the upper archform relative to the lower archform.

Claim 10. (new) The apparatus of claim 1, wherein said software further including a measurement tool enabling a user to measure in three planes of space the distance between two points on said virtual three dimensional model.

Claim 11. (new) The apparatus of claim 1, wherein with the aid of the software the user alters positions of one or more brackets placed on the surface of the teeth of the patient prior to said software automatically deriving the three-dimensional configuration of the customized orthodontic archwire

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